Traffic Impact Review
Cumberland Quarry

Severn Aggregates Limited

P/N 12-2649 | Revised January 14, 2025

Township of
Severn
County of Simcoe

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TRAFFIC IMPACT REVIEW

CUMBERLAND QUARRY

TOWNSHIP OF SEVERN

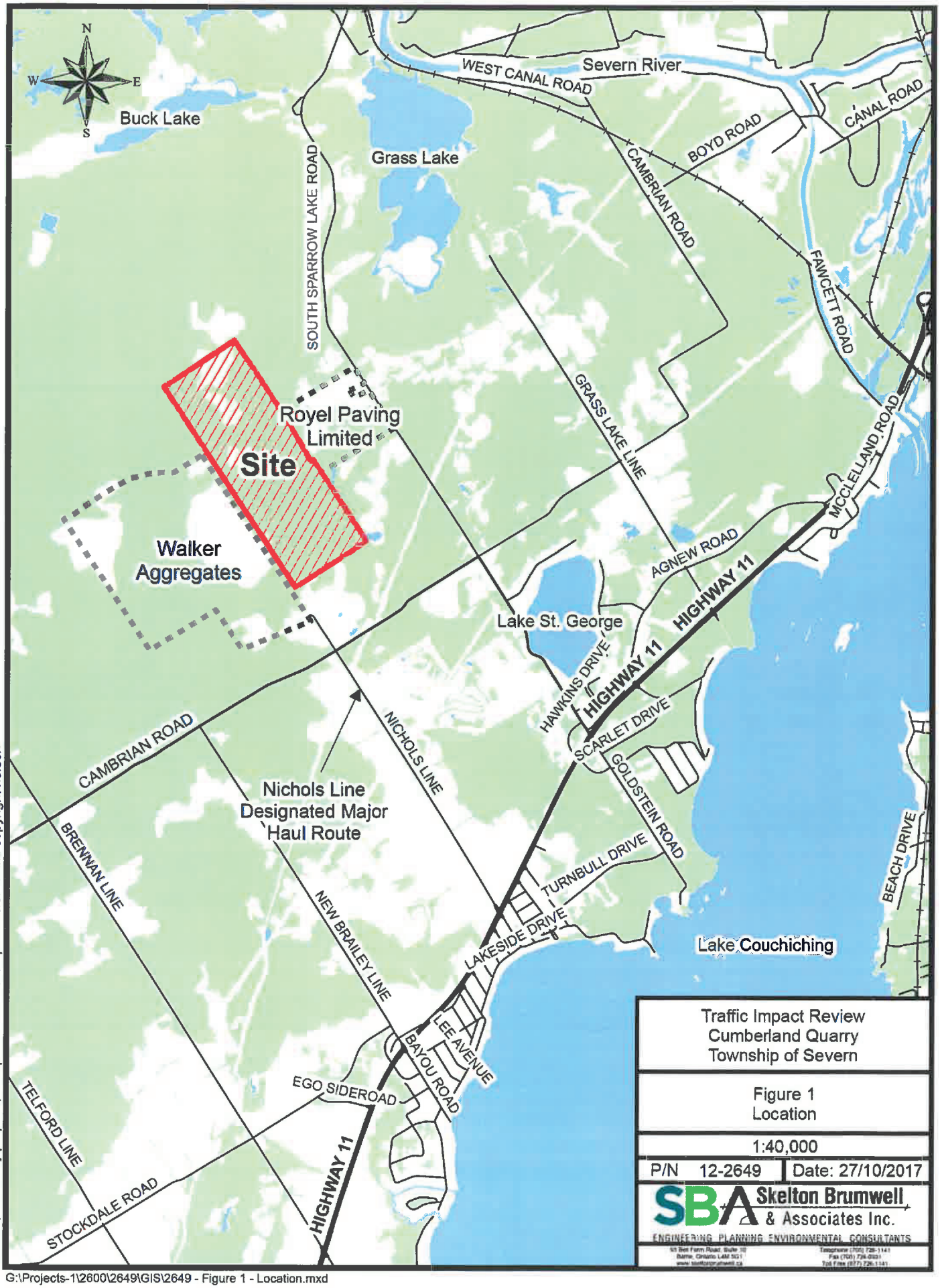
P/N 12-2649 Revised January 14, 2025

1.0 Introduction

Severn Aggregates Limited is proposing to develop a new limestone quarry to be located on a 138 hectare parcel of land located at the north-western terminus of Nichols Line, generally north of Highway 11 and west of South Sparrow Lake Road. The legal description of the site is west half of Lots 12, 13 and 14, Concession 11, in the Geographic Township of Orillia, North Division, now in the Township of Severn. The site location is shown on Figure 1 on the following page.

The Cumberland Quarry proposal is for a maximum annual extraction of 500,000 tonnes of limestone for dimensional stone and crushed stone products. The proposed quarry is situated immediately east of the existing Severn Pines Quarry which is operated by Walker Aggregates Inc. The Severn Quarry has a licensed area of 178.8 hectares and has a maximum allowable annual extraction of 3 million tonnes.

This study is intended to address policies and support applications for amendments to the Township of Severn Official Plan and Zoning By-law. The original version of this study was produced in October of 2017 in support for an application under the Aggregate Resources Act (ARA) for a Category 2, Class A license.



Traffic Impact Review
Cumberland Quarry
Township of Severn

Figure 1
Location

1:40,000

P/N 12-2649 | Date: 27/10/2017

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ENGINEERING PLANNING ENVIRONMENTAL CONSULTANTS

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G:\Projects-1\2600\2649\GIS\2649 - Figure 1 - Location.mxd

2.0 Context

The market area for the proposed Cumberland Quarry is primarily the northern GTA including York Region and Peel Region. Some product would also be destined for locations in Simcoe County, including Orillia and Barrie, and a smaller percentage of the material may be shipped to locations in Muskoka including Gravenhurst, Bracebridge and Huntsville. Nichols Line is designated as a Major Haul Route in the Township's Official Plan and as a Haul Route in the Transportation Study. It will be the only Township maintained haul route for the proposed quarry, providing direct access to Highway 11. Nichols Line currently terminates in a cul-de-sac at the entrance to the Walker Quarry which is about 350 metres north of Cambrian Road. For the entrance to the new quarry, Nichols Line will be extended about another 780 metres northward along the existing unopened road allowance. There will be a separate exit location for the quarry which will be about 300 metres north of the cul-de-sac. The total distance from the new quarry entrance to Highway 11 will be about 3.7 kilometres.

Highway 11 through this area is a four lane, divided highway with partially controlled access and a posted speed limit of 90 km/hr. Access to and from Highway 11 at Nichols Line is restricted to the southbound lanes as there is no interchange at this location. For product being shipped south, loaded trucks will take Nichols Line to Highway 11 and then proceed south on Highway 11. Empty trucks returning northbound to the site would exit Highway 11 at South Sparrow Lake Road, cross over the highway to access the southbound lanes and then proceed south to the Nichols Line exit. Trucks shipping product northward would take Highway 11 south to the New Brailey Line / Bayou Road exit and then cross over the highway to access the northbound lanes. Southbound returning empty trucks would just exit at the Nichols Line.

Between the access point for the Cumberland Quarry and Highway 11, Nichols Line is straight and relatively flat with excellent sight distance and a posted speed limit is 60 km/hr. The roadway has an asphalt width of about 7.2 metres with approximately 1.5 metre wide gravel shoulders. There are five residences situated along Nichols Line between the proposed quarry site and Highway 11, and there is one commercial operation, KRS Crane Rentals, which is located at the northerly corner of the Nichols Line / Highway 11 intersection. We understand that the majority of the properties along Nichols Line are owned by Walker Aggregates.

In 1998, the Township of Severn entered into a Haul Route Agreement with Georgian Aggregates, the predecessor to Walker Aggregates. The Agreement covered the reconstruction of Nichols Line required to accommodate the Severn Quarry, which at that time was being licensed for 1 million tonnes per year.

A subsequent Haul Route Agreement was signed between the Township, Walker Aggregates and MAQ Aggregates in 2008. MAQ Aggregates owns a quarry licensed for a maximum of 1 million tonnes per year in the east half of Lots 12 and 13, Concession 8 which is accessed from Brennan Line. The new agreement covered additional improvements to Nichols Line, including reconstruction work at the intersection of Nichols Line and Cambrian Road, and at the intersection with Highway 11. These works were necessary to allow for the additional traffic from MAQ Aggregates to use Nichols Line as a haul route, and to allow for an increase in the annual licensed tonnage for Severn Quarry from 1 million to 3 million tonnes.

The 2008 Agreement also covers the use of a truck marshalling yard, which was built on the east side of Nichols Line, just north of Highway 11. The yard has a gravel surface measuring roughly 115 metres wide by 245 metres long. The marshalling yard provides an area for trucks going to the Walker and MAQ quarries to park early in the morning if they arrive before the quarries have opened.

3.0 Travel Demand

3.1 Historic and Future Traffic Volumes

The Township of Severn does not have any traffic count information for Nichols Line. With only five residences along Nichols Line, it is likely that almost all of the traffic on the roadway will be that generated by the existing Walker and MAQ quarry operations.

Annual traffic volume data for Highway 11 are available from the Ministry of Transportation for 1990 through 2021 and is included in Appendix A. The Average Annual Daily Traffic (AADT) volume in 1990 was 21,400 vehicles compared to 26,100 in 2021, an average annual increase of about 0.64%. Using an Excel spreadsheet to complete a regression analysis and produce a line of best fit results in an estimated volume of 26,966 vehicles in 2026 and 28,345 in 2036. This is shown graphically in Appendix A.

Given that Highway 11 acts as one of the main routes into the cottage area of Muskoka, peak traffic volumes on Highway 11 occur on the weekends in the summer months. More specifically, the peak traffic in the northbound lanes would be on Friday afternoon and evenings, while the peak for the southbound lanes would occur on Sunday afternoon and evenings. The Summer Average Daily Traffic (SADT) between July 1 and August 30 has shown an overall downward trend, going from 37,400 in 1990 to 30,000 in 2021. Within the range of those dates, the SADT volumes have been highly variable, ranging from a low of 29,700 in 2017 to a high of 40,700 in 2004. It is noted that the SADT volumes decreased between 1991 and 1993, and there was also a substantial decrease from 2007 to 2011, which reflects the economic slowdowns that occurred at both those times. Volume projections to 2026 and 2036 are shown in Appendix A, however we do not consider the calculations to be very accurate considering the high variability of the data set. The projected volumes are actually quite a bit less than the measured volumes from 2008.

The Summer Average Weekday Daily Traffic (SAWDT) data was 29,700 in 1990 and 30,200 in 2021, although it reached a low of 28,400 in 1992 and a high of 36,300 in 2008. Those counts were also influenced by the economic factors in 1991 and 2008. Projecting that data forward results in an estimated volume of 30,984 vehicles in 2026 and 31,110 in 2036. Those values are less than the peak volumes recorded in 2007 (35,400) and 2008 (36,300), so it's possible that the counts from those years were somewhat of an anomaly.

As the traffic volumes on Highway 11 have increased over the years, the Accident Rate has dropped from 0.5 accidents per million vehicle kilometers (MVKM) in 1990 to 0.4 per MVKM in 2021.

3.2 Site Generated Traffic

Calculations for the site generated traffic volumes for both the average and maximum tonnage are included in Appendix B. The volumes for the proposed operation were calculated based on the expected operational and transportation information provided by the applicant Severn Aggregates Limited.

The amount of material shipped from the site will vary from year to year depending on market conditions. However, it cannot exceed the maximum tonnage permitted by the Licence under the

Aggregate Resources Act, which is proposed to be 500,000 tonnes. The annual average production is estimated to be 250,000 tonnes.

Ninety percent of the annual tonnage is expected to be shipped from May 1st to November 30th each year due to reduced demand in the winter. The traffic generated by the operation will be comprised primarily of trucks transporting the aggregate products from the quarry to customers, with relatively small numbers of employee and service vehicles.

The truck traffic generated by pits and quarries tends to be distributed relatively evenly throughout the day. Processing operations such as crushing, screening and washing will take place from 7:00 a.m. to 6:00 p.m. on weekdays and 7:00 a.m. to 12:00 p.m. on Saturdays. Loading and shipping will take place from 6:00 a.m. to 6:00 p.m. Monday to Friday and 6:00 a.m. to 12:00 p.m. on Saturdays. Blasting will be allowed from 8:00 a.m. to 6:00 p.m. on weekdays, while other construction activities will occur from 7:00 a.m. to 7:00 p.m. Monday to Friday. No site operations will occur on statutory holidays. The hours of operation are listed on the ARA Site Plan.

The average daily traffic volume from the proposed pit is calculated to be 92 trips per day or 8 trips per hour at the average annual production of 250,000 tonnes and 183 trips per day or 15 trips per hour at the maximum annual production of 500,000 tonnes.

These volumes are total trips, so a volume of 15 trips per hour means 8 trips (rounded up) travelling up Nichols Line from Highway 11 to the quarry, and 8 trips travelling back down Nichols to Highway 11.

3.3 Nichols Line Traffic

As noted in Section 2.0, there are only five residences situated on Nichols Line, so it is expected that the majority of the traffic on the road will be generated by the existing Walker and MAQ Aggregates quarries and the proposed Cumberland Quarry. The licensed limits of the two existing operations total 4 million tonnes, so with the new quarry the total would be 4.5 million tonnes. The Cumberland Quarry could therefore increase the maximum annual production by 500,000 tonnes or 12.5%. Because Nichols Line has been re-constructed as recently as about 2008 to accommodate heavy truck traffic from the Walker and MAQ Aggregates quarries and is

designated as a major haul route, it should be structurally adequate to carry the additional traffic from the Severn Quarry.

In any given year it is very unlikely that all three quarries would be running at maximum production rates. To approximate the traffic volume, a best estimate would be to assume an average production equal to 50% of the total licensed limit for all three quarries. Assuming a similar breakdown for the truck fleet and directly pro-rating the calculated trips for the Cumberland Quarry results in a total of 825 trips per day or about 69 trips per hour. With other traffic from the local residents, a typical day during the construction season could see around 1,000 trips per day on the roadway, with the majority of the trips being trucks. Under Ministry of Transportation Design Guidelines, this would classify the road as a rural local road having relatively traffic low-volumes.

4.0 Evaluation Of Impacts

4.1 Methodology

For traffic studies such as this, the impact on the transportation system is typically evaluated using the methods described in the 7th Edition of the Highway Capacity Manual (HCM 2022) to determine the expected Level of Service for both existing and future traffic conditions. The Level of Service definitions are included in Appendix C. The traffic software program “HCS 2024” by McTrans was used to carry out any required calculations.

At intersections, the objective of the analysis is to identify "problem" intersections and traffic movements. For rural areas, "problem" intersections and movements are typically defined as those where a Level of Service “D” is incurred, meaning that motorists attempting to turn at intersections would experience longer delays. Generally, traffic impacts should be mitigated when site generated traffic creates or worsens a "problem" situation.

For two-lane roadways, a “problem” roadway would also be where a Level of Service “D” is incurred, which means that traffic flow is generally unstable and it is very difficult to pass slower traffic.

4.2 Analysis

For the Cumberland Quarry, the proposed access driveway is at the end of Nichols Line, and the access to and from Highway 11 is via ramps that are not under stop control. There is, therefore, nothing to delay the turning movements to and from Nichols Line and therefore no issue with the Level of Service at these intersections.

Empty trucks returning northbound to the quarry will exit right on the ramp to South Sparrow Lake Road, make a right turn onto the Highway 11 overpass, make another right turn (at a stop sign) to get back onto South Sparrow Lake Road on the west side of the highway, and then take the ramp right back onto Highway 11 south. The only place where there could be any delay in a turning movement is at the stop sign on South Sparrow Lake Road where trucks will turn right to get back onto Highway 11 south. The background traffic volumes on this road were observed to be quite low, so in our opinion the additional truck traffic will have little impact and the intersection will continue to operate at a good Level of Service.

A small percentage of loaded trucks may head northbound towards Gravenhurst. These trucks would travel south on Highway 11, exit right on the ramp to New Brailey Line, then make a left turn to get on the Highway 11 overpass, make another left turn from the stop sign at Bayou Road and then take the ramp right onto Highway 11 north. The left turning movements could be subject to some delay depending on the background traffic volumes. Similar to South Sparrow Lake Road, New Brailey Line and Bayou Road do not appear to be carrying very high volumes of traffic, so the Level of Service for these turning movements should be very good. Also, since only a small percentage of the quarry traffic is expected to be going in this direction, the impact will be minimal.

Referring to the Level of Service definitions in Appendix C, it can be seen that for a Level of Service "A", the maximum flow volume could be up to 490 cars / hour in each direction. In Section 3.3 it was noted that the combined traffic from all three quarries could be around 69 trips per hour (35 trips in each direction) based on 50% of the total licensed limits in any given year. If the calculation was based on maximum licensed limits, this would increase to 70 trips in each direction and even allowing for additional background traffic this would still be well under 490 cars / hour (total for both directions) for Level of Service "A". Therefore, Nichols Line would be operating at a good Level of Service now and that will not change with the additional traffic from

the proposed Cumberland Quarry. To confirm this, HCS 2024 was used to analyze the operation of the roadway. Using a volume of 80 trucks per hour in each direction, the Follower Density (followers / km) was calculated to be 0.20. This is well below the maximum value for Level of Service "A" of 1.2, so there will be no problem on this road from an operational point of view. The HCS 2024 calculation can be found in Appendix D.

In Section 3.1 it was noted that the 2021 SAWDT volume was 31,900 vehicles per day, with volumes of 30,984 and 31,110 projected for 2026 and 2036 respectively. As per Section 3.2, operating at the maximum allowable licensed tonnage the Cumberland Quarry could generate around 183 trips per day on Highway 11. This represents an increase in traffic of only about 0.6% over the 30,984 vehicles per day projected for 2026, which is considered negligible. Therefore, the proposed quarry will have very little impact on Highway 11 traffic conditions.

5.0 Conclusions

Based on our research and analysis, we conclude the following:

- At the maximum licensed tonnage for the proposed aggregate extraction operation, the proposed Cumberland Quarry could generate up to 183 trips per day from May to November. It is estimated that this volume could result in an average hourly volume of up to 15 trips per hour (8 in / 8 out).
- It is expected that most of the trucks from the quarry will be transporting product south towards Orillia, Barrie and the northern GTA, although some trips will be made northward towards the Gravenhurst, Bracebridge and Huntsville areas.
- Traffic to and from the quarry will use Highway 11 and Nichols Line. Because there is no interchange at Nichols Line, trucks will also need to utilize the overpasses at South Sparrow Lake Road and at New Brailey Line / Bayou Road.
- The Level of Service for trucks travelling on Nichols Line will be excellent as the total traffic volume will be relatively low and there are no turning movements that would cause any delays to the traffic.
- The turning movements from the Cumberland Quarry that would occur at South Sparrow Lake Road and at New Brailey Line / Bayou Road should not have any adverse impact on the Level of Service at those locations as the existing volumes are relatively low.

- The additional traffic from the quarry will have virtually no impact on the traffic conditions for Highway 11.

6.0 Disclaimer of Responsibilities to Third Parties

This report was prepared by Skelton, Brumwell & Associates Inc. for the account of Severn Aggregates Inc.

The material in it reflects Skelton, Brumwell & Associates Inc.'s best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

Skelton, Brumwell & Associates Inc. accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this report.

All of which is respectfully submitted,

SKELTON, BRUMWELL & ASSOCIATES INC.

per:

Scott W. Brumwell, P.Eng.

Vice President

Appendix A

Highway 11 Traffic Volumes

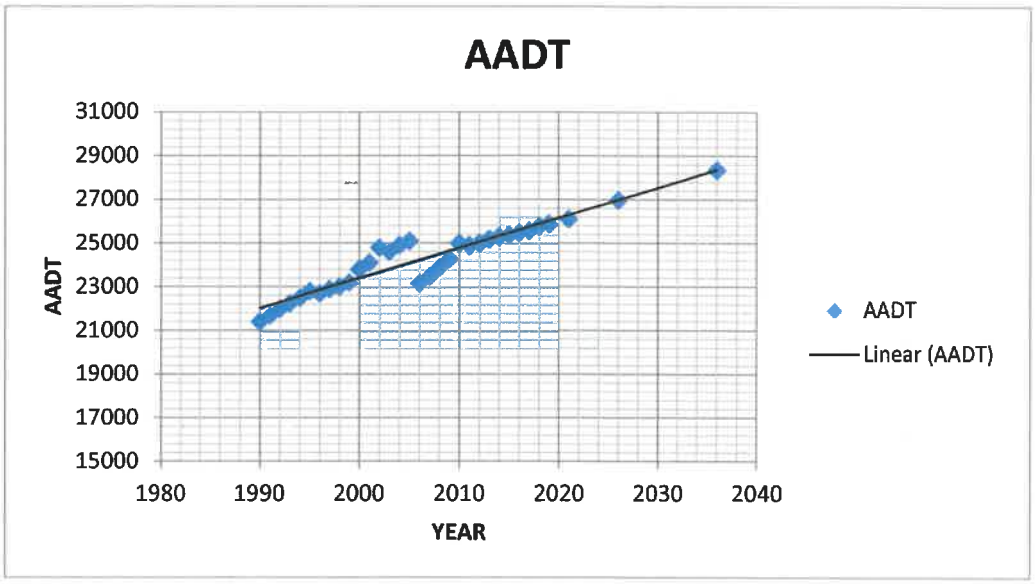
PROVINCIAL HIGHWAYS TRAFFIC VOLUMES 1988-2019, 2021

Year	Highway	Location Description	Dist (KM)	Pattern Type	AADT	SADT	SWADT	WADT	Truck AADT	Total Collisions	Total CR	Trucks Collisions	Truck CR
2004	11			LR	24,900	40,700	32,400	16,600	2,000	54	0.8	6	0.1
2005	11			LR	24,600	38,400	31,000	16,700	1,950	63	0.9	10	0.1
2006	11			LR	24,800	38,600	31,000	16,700	2,000	50	0.7	3	0.0
2007	11			LR	25,000	39,200	37,600	16,800	2,250	20	0.3	4	0.1
2008	11			LR	25,100	39,200	38,200	17,200	2,250	44	0.6	1	0.0
2009	11			IR	24,400	29,300	26,600	20,700	2,200	36	0.5	4	0.1
2010	11			IR	25,500	30,400	27,800	21,700	2,300	37	0.5	2	0.0
2011	11			CTR	25,700	31,300	30,100	21,800	2,300	36	0.5	7	0.1
2012	11			CTR	25,900	31,400	31,000	22,100	2,350	28	0.4	5	0.1
2013	11			CTR	26,000	31,600	32,700	22,100	2,350	46	0.7	6	0.1
2014	11			CR	26,200	30,900	30,700	22,300	2,350	42	0.6	6	0.1
2015	11			CR	26,400	31,100	30,900	22,500	2,400	32	0.4	8	0.1
2016	11			CR	26,600	31,300	31,200	22,700	2,400	37	0.5	4	0.1
2017	11			CR	26,800	31,100	31,200	24,100	2,400	33	0.5	1	0.0
2018	11			CR	27,000	31,400	31,600	24,200	2,450	35	0.5	5	0.1
2019	11			CR	27,100	31,400	31,600	24,300	2,450	54	0.7	14	0.2
2021	11			CR	27,500	31,600	31,900	24,800	2,500	44	0.6	7	0.1
1990	11	NEW BRAIDLEY LINE/BAYOU RD IC-144	7.8	LR	21,400	37,400	29,700	13,500	2,150	32	0.5	4	0.1
1991	11			LR	21,700	38,200	30,200	13,700	2,150	37	0.6	1	0.0
1992	11			LR	22,000	35,400	28,400	14,500	2,200	43	0.7	1	0.0
1993	11			LR	22,300	35,900	28,700	14,600	2,250	43	0.7	3	0.0
1994	11			LR	22,500	37,000	29,800	14,700	2,250	24	0.4	0	0.0
1995	11			LR	22,800	38,300	31,000	15,000	2,300	32	0.5	2	0.0
1996	11			LR	22,700	38,000	30,500	15,100	2,250	38	0.6	4	0.1
1997	11			LR	22,900	38,500	30,900	15,300	2,300	41	0.6	0	0.0
1998	11			LR	23,000	38,000	30,600	15,200	2,300	29	0.4	1	0.0
1999	11			LR	23,200	38,000	30,600	15,300	2,300	24	0.4	1	0.0
2000	11			LR	23,800	38,600	31,100	15,900	2,400	35	0.5	1	0.0
2001	11			LR	24,100	39,400	31,400	16,100	2,400	37	0.5	2	0.0
2002	11			LR	24,800	40,400	32,300	16,800	2,500	33	0.5	5	0.1
2003	11			LR	24,600	38,900	31,300	16,600	2,450	35	0.5	5	0.1
2004	11			LR	24,900	40,700	32,400	16,600	2,500	32	0.5	2	0.0
2005	11			LR	25,100	39,200	31,600	17,100	2,500	32	0.4	2	0.0
2006	11			LR	23,200	36,100	29,000	15,700	2,300	43	0.7	5	0.1
2007	11			LR	23,500	36,800	35,400	15,800	3,050	44	0.7	3	0.0
2008	11			LR	23,900	37,300	36,300	16,400	3,100	42	0.6	10	0.1
2009	11			LR	24,300	36,900	30,100	16,500	3,150	24	0.3	2	0.0
2010	11			CTR	25,000	30,400	29,200	21,200	3,250	17	0.2	2	0.0
2011	11			CTR	24,900	30,300	29,100	21,100	3,250	30	0.4	2	0.0
2012	11			CTR	25,000	30,300	29,900	21,300	3,250	42	0.6	1	0.0
2013	11			CTR	25,200	30,700	31,700	21,400	3,300	30	0.4	5	0.1

Year	Highway	Location Description	Dist (KM)	Pattern Type	AADT	SADT	SWADT	WADT	Truck AADT	Total Collisions	Total CR	Trucks Collisions	Truck CR
2014	11			CTR	25,300	30,900	31,100	21,500	3,300	28	0.4	5	0.1
2015	11			CR	25,400	29,900	29,700	21,600	3,300	24	0.3	1	0.0
2016	11			CR	25,500	30,100	29,900	21,700	3,300	33	0.5	6	0.1
2017	11			CR	25,600	29,700	29,800	23,000	3,350	22	0.3	1	0.0
2018	11			CR	25,800	30,000	30,200	23,200	3,350	27	0.4	8	0.1
2019	11			CR	25,900	30,100	30,200	23,200	3,350	42	0.6	7	0.1
2021	11			CR	26,100	30,000	30,200	23,500	3,400	32	0.4	4	0.1
1988	11	SIMCOE RD 169 IC-152	2.3	LR	15,800	28,000	19,900	9,800	1,750	31	2.4	3	0.2
1989	11			LR	16,500	27,900	21,400	10,900	1,800	19	1.4	4	0.3
1990	11			LR	16,800	29,400	23,400	10,600	1,850	13	0.9	4	0.3
1991	11			LR	16,700	29,400	23,200	10,500	1,650	13	0.9	1	0.1
1992	11			LR	16,900	27,200	21,800	11,200	2,700	28	2.0	2	0.1
1993	11			LR	17,300	27,900	22,300	11,300	2,750	19	1.3	0	0.0
1994	11			LR	17,400	28,600	23,000	11,400	2,800	14	1.0	2	0.1
1995	11			LR	18,000	30,200	24,500	11,800	2,900	24	1.6	1	0.1
1996	11			LR	17,800	29,800	23,900	11,900	2,850	16	1.1	1	0.1
1997	11			LR	19,200	32,300	25,900	12,900	3,050	17	1.1	0	0.0
1998	11			LR	19,600	32,300	26,100	12,900	3,150	17	1.1	2	0.1
1999	11			LR	19,500	32,000	25,700	12,900	3,100	17	1.1	1	0.1
2000	11			LR	19,900	32,200	26,000	13,300	1,000	15	0.9	1	0.1
2001	11			LR	20,200	33,100	26,300	13,500	1,000	20	1.2	1	0.1
2002	11			LR	20,600	33,600	26,800	13,900	1,050	24	1.4	2	0.1
2003	11			LR	20,700	32,700	26,300	14,000	1,050	18	1.1	0	0.0
2004	11			LR	21,400	35,000	27,900	14,300	1,050	21	1.2	1	0.1
2005	11			LR	21,400	33,400	27,000	14,600	1,050	17	1.0	1	0.1
2006	11			LR	21,400	33,300	26,800	14,400	1,050	19	1.1	3	0.2
2007	11			LR	21,700	34,000	32,600	14,600	1,950	16	0.9	0	0.0
2008	11			LR	21,300	33,200	32,400	14,600	1,900	16	0.9	2	0.1
2009	11			LR	21,800	33,100	27,000	14,800	1,950	10	0.6	0	0.0
2010	11			LR	22,400	33,500	27,400	15,200	2,000	13	0.7	1	0.1
2011	11			LR	22,800	35,300	33,100	16,000	2,050	14	0.7	3	0.2
2012	11			LR	23,100	34,500	33,500	15,900	2,100	8	0.4	1	0.1
2013	11			LR	23,400	35,000	40,000	15,900	2,100	17	0.9	0	0.0
2014	11			HR	23,700	35,700	35,900	14,600	2,150	10	0.5	3	0.2
2015	11			HR	24,000	36,100	36,400	14,800	2,150	14	0.7	1	0.1
2016	11			HR	24,300	36,600	36,800	15,000	2,200	8	0.4	0	0.0
2017	11			HR	24,600	39,900	40,100	16,700	2,200	14	0.7	1	0.0
2018	11			HR	24,800	40,400	40,500	17,000	2,250	14	0.7	4	0.2
2019	11			HR	25,100	40,600	40,700	17,200	2,250	14	0.7	2	0.1
2021	11			HR	25,700	40,400	40,500	17,700	2,300	5	0.2	0	0.0
1988	11	GRAVENHURST S LTS SEVERN R BR	15.9	LR	15,800	28,000	19,900	9,800	1,750	83	0.9	11	0.1

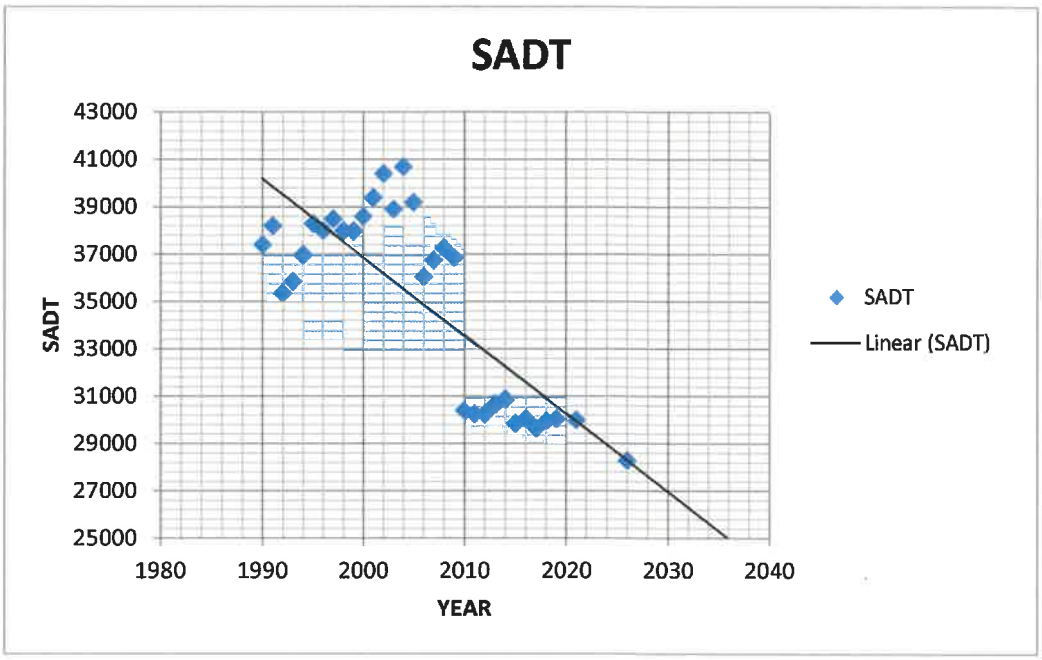
Highway 11 Historical Traffic Volumes - Bayou Road / Brailey Line

Year	AADT
1990	21400
1991	21700
1992	22000
1993	22250
1994	22500
1995	22800
1996	22700
1997	22900
1998	23000
1999	23200
2000	23800
2001	24100
2002	24800
2003	24600
2004	24900
2005	25100
2006	23200
2007	23500
2008	23900
2009	24300
2010	25000
2011	24900
2012	25000
2013	25200
2014	25300
2015	25400
2016	25500
2017	25600
2018	25800
2019	25900
2021	26100
2026	**26966** (projected)
2036	**28345** (projected)



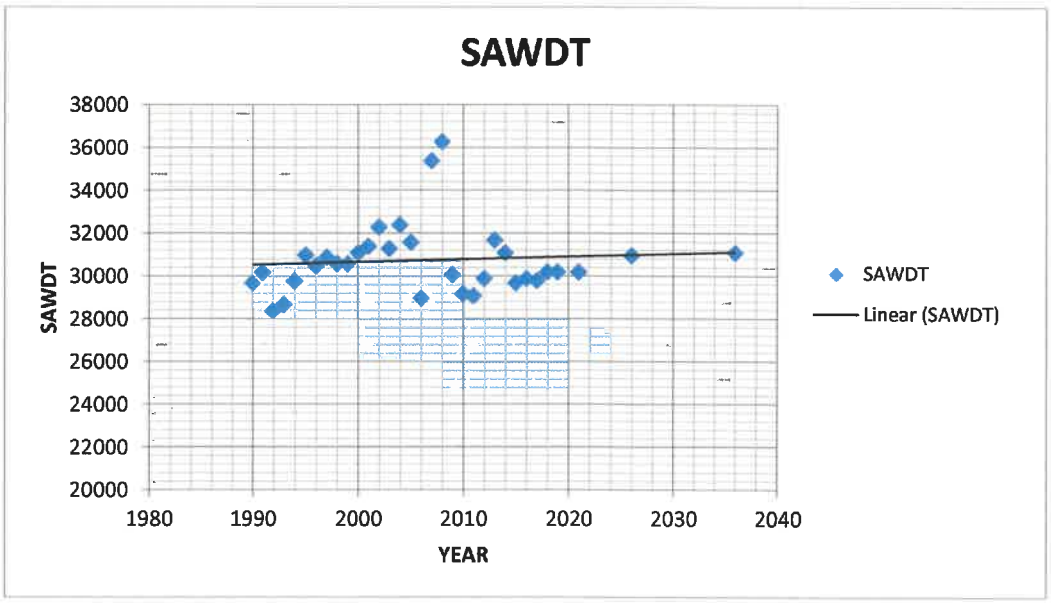
Highway 11 Historical Traffic Volumes - Bayou Road / Brailey Line

Year	SADT
1990	37400
1991	38200
1992	35400
1993	35900
1994	37000
1995	38300
1996	38000
1997	38500
1998	38000
1999	38000
2000	38600
2001	39400
2002	40400
2003	38900
2004	40700
2005	39200
2006	36100
2007	36800
2008	37300
2009	36900
2010	30400
2011	30300
2012	30300
2013	30700
2014	30900
2015	29900
2016	30100
2017	29700
2018	30000
2019	30100
2021	30000
2026	**28279** (projected)
2036	**24975** (projected)



Highway 11 Historical Traffic Volumes - Bayou Road / Brailey Line

Year	SADT
1990	29700
1991	30200
1992	28400
1993	28700
1994	29800
1995	31000
1996	30500
1997	30900
1998	30600
1999	30600
2000	31100
2001	31400
2002	32300
2003	31300
2004	32400
2005	31600
2006	29000
2007	35400
2008	36300
2009	30100
2010	29200
2011	29100
2012	29900
2013	31700
2014	31100
2015	29700
2016	29900
2017	29800
2018	30200
2019	30200
2021	30200
2026	**30984** (projected)
2036	**31110** (projected)



Appendix B

Site Generated Traffic

APPENDIX B
SITE GENERATED TRAFFIC
SEVERN AGGREGATES - CUMBERLAND QUARRY

PIT AGGREGATE

Production

Average	250,000	tonnes
Maximum	500,000	tonnes

Fleet Usage	Tonnes Per Load	% of Trips
Tandem	15	10%
Triaxle	23	10%
Semi Trailer	37	80%

Average per Load 33.4 tonnes

Annual Trip Generation

	Total Annual Tonnage	Tonnes Per Load	Trips Per Year
Average Year	250,000	33.4	7,485
		Total Trips Out	7,485
		Total Trips In	7,485
		Total Trips (Out + In)	14,970
Maximum Year (Licence Limit)	500,000	33.4	14,970
		Total Trips Out	14,970
		Total Trips In	14,970
		Total Trips (Out + In)	29,940

Daily Trip Generation

Percentage (%) shipped in peak months		90%
Peak Months:	May to November	7
Average number of working days per month:		21
Daily Peak Traffic Factor:		1

Total Annual Tonnage	Total Trips Per Year	Total Working Days in Peak Months	Trips Per Day in Peak Months
250,000	14,970	147	92
500,000	29,940	147	183

APPENDIX B
SITE GENERATED TRAFFIC
SEVERN AGGREGATES - CUMBERLAND QUARRY

TOTAL TRIP GENERATION

Hours of Operation	
From:	6:00 AM
To:	6:00 PM
Total Hours:	12
% Shipped in Peak Hours	100%

Total Annual Tonnage	Trips Per Day	Average Trips Per Peak Hour	Minutes Between Trips
250,000	92	8	7.8
500,000	183	15	3.9

Appendix C

Level of Service Definitions

LEVEL OF SERVICE AT UNSIGNALIZED INTERSECTIONS

The assessment of unsignalized intersections is based on the methods described in the "Highway Capacity Manual 2010", published in 2010 by the Transportation Research Board.

The term "Level of Service" is often used to assist in clarifying the arithmetic analysis associated with traffic engineering. "Level of Service" implies a qualitative measure of traffic flow at an intersection, and is dependent upon vehicle delay and vehicle queue lengths at the approaches. The Level of Service can be determined based on the ratio between traffic volumes and approach capacity or "V/C" ratio. The following table describes the characteristics of each level:

Level of Service	Description	Control Delay (sec)
A	Little or no traffic delay occurs. Approaches appear open, turning movements are easily made, and drivers have freedom of operation.	≤10
B	Short traffic delays occur. Many drivers begin to feel somewhat restricted in terms of freedom of operation.	10 to 15
C	Average traffic delays occur. Operations are generally stable, but drivers emerging from the minor street may experience difficulty in completing their movement. This may occasionally impact on the stability of flow on the major street.	15 to 25
D	Longer traffic delays occur. Motorists emerging from the minor street experience longer delays in making turns. Drivers on the major street will experience congestion and delay as drivers emerging from the minor street interfere with the major through movements.	25 to 35
E	Very long traffic delays occur. Operations approach the capacity of the intersection.	35 to 50
F	Saturation occurs, with vehicle demand exceeding the available capacity. Extremely long traffic delays occur.	>50

LEVEL OF SERVICE FOR TWO LANE HIGHWAYS

Posted Speed Limit ≥ 80 km/hr

The assessment of Two-Lane Roadways is based on the methods described in the "Highway Capacity 7th Edition", published in 2022 by the Transportation Research Board.

The term "Level of Service" is often used to assist in clarifying the arithmetic analysis associated with traffic engineering. "Level of Service" implies a qualitative measure of traffic flow on a roadway, and for a Class II two lane roadway is dependent upon the percent time-spent-following other vehicles. The following table describes the characteristics of each level:

Level of Service	Description	Follower Density (followers /km)
A	Highest quality of traffic service, where motorists are generally able to travel at their desired speed. Motorists will not be delayed in platoons for more than 40 percent of their travel time. A maximum flow rate of 490 cars/ hour total in both directions can be achieved with base conditions.	≤ 1.2
B	The demand for passing to maintain desired speeds becomes more significant. Drivers will not be delayed in platoons for more than 55 percent of their travel time. A flow rate of up to 780 cars / hour total for both directions with base conditions can be achieved.	> 1.2 to 2.5
C	There are noticeable increases in platoon formation, platoon size and frequency of passing impediments. Motorists will not be delayed in platoons for more than 70% of their travel time. A total flow rate of 1,190 cars / hour can be achieved with base conditions.	> 2.5 to 5.0
D	Unstable traffic flow where passing is extremely difficult. Drivers will not be delayed in platoons for more than 85 percent of their travel time. Maximum flow rates of up to 1,830 cars / hour total in each direction can be achieved under base conditions.	> 5.0 to 7.5
E	Passing is virtually impossible and platooning is very intense, with drivers being delayed in platoons for more than 85 percent of their travel time. The highest volume attainable would generally be up to 1,700 cars / hour in one direction and 3,200 cars / hour total for both directions.	> 7.5

Appendix D

Nichols Line HCS 2024 Analysis

HCS Two-Lane Highway Report

Project Information

Analyst	S. Brumwell	Date	1/3/2025
Agency	Skelton, Brumwell	Analysis Year	2026
Jurisdiction	Severn Township	Time Analyzed	
Project Description	Cumberland Quarry	Units	Metric System

Segment 1

Vehicle Inputs

Segment Type	Passing Zone	Length, m	3000.0
Lane Width, m	3.7	Shoulder Width, m	0.0
Speed Limit, km/h	80	Access Point Density, pts/km	4.4

Demand and Capacity

Directional Demand Flow Rate, veh/h	85	Opposing Demand Flow Rate, veh/h	85
Peak Hour Factor	0.94	Total Trucks, %	100.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.05

Intermediate Results

Segment Vertical Class	1	Free-Flow Speed, km/h	76.8
Speed Slope Coefficient (m)	2.87725	Speed Power Coefficient (p)	0.58124
PF Slope Coefficient (m)	-1.19785	PF Power Coefficient (p)	0.77568
In Passing Lane Effective Length?	No	Follower Density, followers/km/ln	0.2
%Improvement to Percent Followers	0.0	%Improvement to Speed	0.0

Subsegment Data

#	Segment Type	Length, m	Radius, m	Superelevation, %	Average Speed, km/h
1	Tangent	3000.0	-	-	76.8

Vehicle Results

Average Speed, km/h	76.8	Percent Followers, %	16.2
Segment Travel Time, minutes	2.34	Adj. Follower Density, followers/km/ln	0.2
Vehicle LOS	A		

Facility Results

T	VkmT veh-km/AP	VHD veh-h/p	Follower Density, followers/ km/ln	LOS
1	60	0.00	0.2	A

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HCS Two-Lane Highway Report

Project Information

Analyst	S. Brumwell	Date	1/3/2025
Agency	Skelton, Brumwell	Analysis Year	2026
Jurisdiction	Severn Township	Time Analyzed	
Project Description	Cumberland Quarry	Units	Metric System

Segment 1

Vehicle Inputs

Segment Type	Passing Constrained	Length, m	3000.0
Lane Width, m	3.7	Shoulder Width, m	0.0
Speed Limit, km/h	80	Access Point Density, pts/km	4.4

Demand and Capacity

Directional Demand Flow Rate, veh/h	85	Opposing Demand Flow Rate, veh/h	-
Peak Hour Factor	0.94	Total Trucks, %	100.00
Segment Capacity, veh/h	1700	Demand/Capacity (D/C)	0.05

Intermediate Results

Segment Vertical Class	1	Free-Flow Speed, km/h	76.8
Speed Slope Coefficient (m)	3.18309	Speed Power Coefficient (p)	0.41674
PF Slope Coefficient (m)	-1.36884	PF Power Coefficient (p)	0.71702
In Passing Lane Effective Length?	No	Follower Density, followers/km/ln	0.2
%Improvement to Percent Followers	0.0	%Improvement to Speed	0.0

Subsegment Data

#	Segment Type	Length, m	Radius, m	Superelevation, %	Average Speed, km/h
1	Tangent	3000.0	-	-	76.8

Vehicle Results

Average Speed, km/h	76.8	Percent Followers, %	20.9
Segment Travel Time, minutes	2.34	Adj. Follower Density, followers/km/ln	0.2
Vehicle LOS	A		

Facility Results

T	VkmT veh-km/AP	VHD veh-h/p	Follower Density, followers/ km/ln	LOS
1	60	0.00	0.2	A

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